The pH Scale Math Game!

Grade 1-3 ... Solve with your mentor!

This area is acidic **This area is not acidic**

Solve the equations below and find the answers on the pH scale. Tell you mentor if that number means acidic (1-7) or not acidic (8-14)

The number 7 is special on the pH scale, it is a very good condition that is not too acidic for marine life

1. **3 - 2 = _ _ _**
2. **11 - 0 = _ _ _**
3. **3 + 4 = _ _ _**
4. **4 - 1 = _ _ _**
5. **10 - 4 = _ _ _**
6. **10 + 4 = _ _ _**
7. **2 + 2 = _ _ _**
8. **9 - 4 = _ _ _**
9. **15 - 5 = _ _ _**
10. **10 - 2 = _ _ _**
11. **7 + 2 = _ _ _**
12. **6 + 6 = _ _**

The pH Scale Math Game!

Grade 4-6 ... Solve with your mentor!

This area is acidic **This area is not acidic (a.k.a basic)**

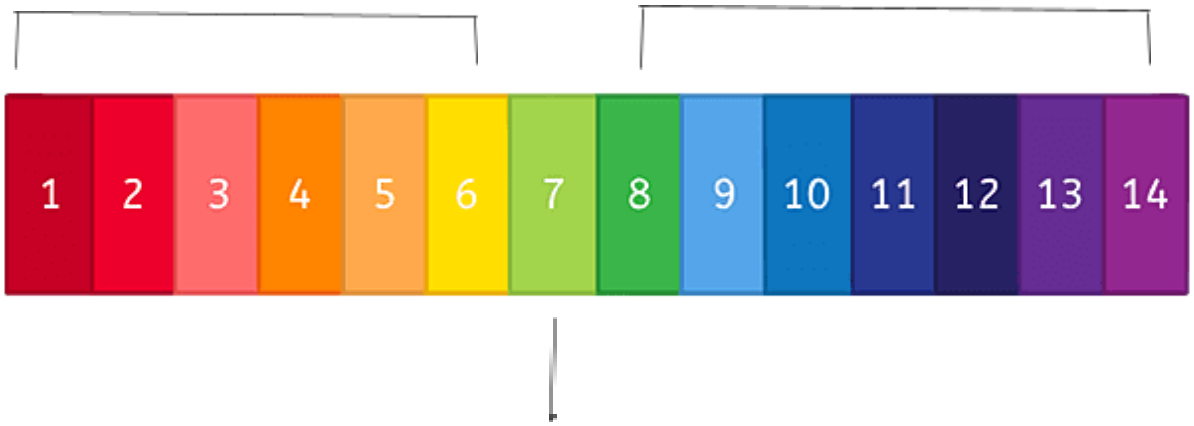
Solve the equations below and find the answers on the pH scale. Tell you mentor if that number means acidic (1-6) or not acidic/basic (8-14) and what you think might happen to sea animals and plants if the pH of the ocean was that number!

1. **5 - 3 + 1 = _ _ _**
2. **(4 × 0) + 1 = _ _ _**
3. **2 × 2 = _ _ _**
4. **7 × 2 = _ _ _**
5. **3 × 2 = _ _ _**
6. **(5 × 2) + 1 = _ _ _**
7. **16 ÷ 2 = _ _ _**
8. **15 - 2 = _ _ _**
9. **20 - 10 = _ _ _**
10. **3 × 3 = _ _ _**
11. **6 × 2 = _ _ _**
12. **4 + 3 = _ _ _**

The pH Scale Math Game!

Grade 7-8 ... Solve!

This area is acidic **This area is basic**



This area is neutral

Solve the equations below and find the answers on the pH scale. Discuss with your mentor if that number corresponds to an acidic or basic pH, and what would happen to marine life if they lived in those conditions.

1. **(5 + 3) − 5 = 3**
2. **(4 × 2) − 6 = 2**
3. **(15 − 3) + 1 = 13**
4. **(4 × 2) + 1 = 9**
5. **(8 ÷ 2) + 2 = 6**
6. **(3 + 2) − 4 = 1**
7. **(12 × 0) + (7 × 2) = 14**
8. **(20 ÷ 4) − 1 = 4**
9. **(3 × 3) − 2 = 7**
10. **(10 − 2) + 2 − 5 = 5**
11. **5 × 2 = 10**
12. **(3 × 4) − 1 = 11**

All about the PLANET!

Station #1

Change in Sea Level

In this experiment, you will examine how our sea level is changing between **Sea Ice** and **Land Ice**.

Your Goal;

To understand the impact of melting sea ice and land ice on sea level changes.

Some useful information to get your started;

As global temperatures rise, ocean water expands, and ice melts, contributing to changes in sea levels. This experiment investigates how melting ice from different locations—sea ice (floating in water) and land ice (sitting on land)—affects sea level.

Materials;

- ★ - Water
- ★ - Ice cubes
- ★ - Two containers (with clay to form land)
- ★ - Marker
- ★ - Ruler

Your steps;

1. Setup Containers:

- Pour water into each container, ensuring it does not overflow the clay land.

2. Add Ice:

- In the land ice container, place a set number of ice cubes (e.g., 8) on the land.
- In the sea ice container, place the same number of ice cubes (e.g., 8) floating in the water.

3. Mark Water Levels:

- Use the permanent marker to mark the initial water level in each container.
- Measure and record the height of the water using the ruler.

4. Wait for Ice to Melt: take a seat and we will continue our lesson, we will come back to this experiment at the end of the session!

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5. Measure Final Water Levels: Welcome back!

- After all ice has melted, measure and compare the final water levels in each container.

Your results;

The Sea Ice Container

The water level stays the same as it was marked because the floating ice pushes aside (displaces) water equal to its weight.

Land Ice Container

The water level rises after the ice melts. The melting land ice adds to the volume of water, resulting in a higher sea level.

To conclude;

Understanding these differences is important in addressing the concerns of rising sea levels and their impacts on ocean communities and ecosystems.

All about the PLANET!

Station #2

Ocean acidification ***and*** *"turtle shells"*

In this experiment, you will examine and observe the effects of ocean acidification on **shell-forming animals.**

Some useful information to get your started;

Increasing levels of carbon dioxide (CO_2) in the atmosphere leads to higher acidity in ocean waters. This experiment explores how this acidification affects the shells of marine animals.

Materials;

- ★ 2 bottles
- ★ Water (300 mL)
- ★ Vinegar (150 mL)
- ★ 2 eggs

Your steps;

1. Setup:

One bottle has already been filled with water, and the other bottle has been filled with the same amount of vinegar (which is very acidic!). The eggs have been sitting in each bottle for 3 days

2. Observation:

- Crack the egg from the water bottle and note its condition.

- Crack the egg from the vinegar bottle and observe any changes in texture and appearance.

Your results;

- Control Egg: The egg remains intact with a normal, hard shell.
- Acidified Egg: The egg shell becomes rubbery and squishy, indicating a significant change due to acid exposure.

To Conclude:

The experiment demonstrates that increased acidity can weaken shells, which is concerning for ocean animals that rely on shells for protection. This reflects potential impacts of climate change on ocean ecosystems.